Harvard Forest Schoolyard Ecology
The Woolly Bully

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Integration into Curriculum

• Integrated into existing units in my conservation/ecology class
  – Not stand alone project
  – Revisited throughout course
  – Ecosystems, feeding interactions, biological controls, invasive species
  – New major component of Native Tree Study
    • Students construct electronic field guides
Eastern Hemlock
*Tsuga canadensis*

- **Leaves:**
  - 0.6 - 0.9 inches long
  - flat
  - under is blue/green
  - top is shiny green/yellow
  - slightly toothed near apex

- **Bark:**
  - brown
  - deep narrow openings
  - scaly

- **Fruit:**
  - egg shape
  - 0.6 – 1 inch long
  - 0.4 - 0.6 inch wide
  - red/brown
  - ovate scales

- **Bud:**
  - egg shape
  - small, 0.05 - 0.1 inch long
  - blunt
  - chestnut brown

- **Height:**
  - 100 feet

- **Commercial Value:**
  - railway ties, pulp, timber, general construction, boxes and crates

**Sample from a student field guide**
Before going outside, consider...

• Medical complications-
  • Communication
• Bug Spray list-Mahar
  • Supervision
• Expectations!
• School Rules
Research protocol-in classroom

- Students never have heard of Woolly Adelgid
- Provide background knowledge
  - Overview of woolly adelgid
    - Introduction into US
    - Distribution
    - Spread
  - Important to study now!
  - Hemlock identification
    - Pine, spruce, hemlock
Identification of plots

• Dictated with lower level
  – Location vs. risk/trust
• Micro-climates- Advanced level
• Aquatic
• Shade
• Direct sun
• Open area
• Other species
• Age of hemlock
Research Protocol

• Supplies
  – Identification markers
  – Data sheet
  – Writing utensils

• Removal of tags - map the area
  – Compass
  – Multiple measuring devices
Research-Part 1

• Tag branches
• Measurements
Research-Part 2

• Hypothesize
  – microclimates
• Locate
• investigate
Identification of Woolly Adelgid Eggs
Woolly Adelgid Eggs-Identification Problems?
Woolly Adelgid Eggs-Identification Problems?
Woolly Adelgid Year 2

• Continue Research
• Expand measurement areas
• Bring in expert?